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Winning margins in British Thoroughbred racehorses

RESEARCH ARTICLE/ SHORT COMMUNICATION

Abstract

In human sporting events the difference between finishing first and second is often less than 1%. For each sporting discipline it is important to know how large an enhancement of performance needs to be before it makes a difference to the medal winning prospects of that athlete. In contrast to the known winning margins in many human sporting disciplines, the winning margins in horse racing are unknown. The winning margins for Group 1, 2 and 3 flat and national hunt races over a 5 year period were calculated. For flat races 3 categories were included: flat races of 6 furlongs, 1 mile or 1 mile 4 furlongs. For national hunt 2 categories were included: hurdle races over 2 miles or chase races over 3 miles. Race times from a total of 416 races were included (275 flat races and 141 national hunt races). Overall the percentage difference between first place and second place was only 0.32%, the difference between coming first and third was 0.75% and between first and fourth was 1.15%. Overall the winning margins between first place and second place were closer for flat races than for national hunt races. When a 1% improvement was applied to the fourth placed horse this would result in the winning time in 76% of flat races and 50% of national hunt races. This study shows the very small margins between winning and placing in horseracing. These results are similar to those of elite human sporting disciplines. This suggests that training strategies and veterinary interventions that result in a small percentage improvement in performance may translate to a meaningful difference in terms of winning/placing.

Key words: racehorse, sport, performance, winning, margin

Introduction

In human sporting events the difference between finishing first and second is often less than 1% (Currell and Jeukendrup 2008). In some sporting disciplines a decrease in athletic performance as low as 1% can push an elite athlete from a gold medal position down to fourth place and small improvements in performance (<1%) can result in a worthwhile enhancement of finishing position (Hopkins *et al.,* 1999, Davison *et al.,* 2009, Andre *et al.,* 2011). Sports science is the scientific process used to guide the practice of sport with the ultimate aim of improving sporting performance (Bishop 2008). Research in sports performance enhancement determines the effect of training, nutritional and medical interventions on the medal winning prospects of top athletes (Hopkins *et al.,* 1999). For each sporting discipline it is important to know how large an enhancement of performance has to be before it makes a difference to the medal winning prospects of that athlete (Hopkins *et al.,* 1999). Therefore in order for veterinary surgeons working in the field of equine sports medicine to optimise the performance of racehorses it is important to be have an understanding of margins between winning and non-winning horses.

In human athletes, research focuses on both within-athlete variation and between-athlete variation (Hopkins *et al.,* 1999, Malcata and Hopkins 2014). Within-athlete variation is the variability in an athlete's performance from competition to competition (Malcata and Hopkins 2014). Within-athlete variation is more difficult to determine for racehorses because

of inconsistencies in Thoroughbred racing in the UK such as track length, track characteristics (straight, left handed, right handed, incline) and track surfaces/going. Between-athlete variation represents the true variation in ability between athletes. In human athletes it has been shown that the greater the spread between the athletes, the greater the enhancement required to promote an athlete to a winning position from a lower ranking (Hopkins *et al.,* 1999).

The purpose of this study was to determine the between-athlete variation for Thoroughbred racehorses competing in Group races. The objectives were 1) to determine the percentage difference between winning and placed racehorses and 2) to determine what difference a 1% improvement to a fourth placed horse would achieve. This information is of value to equine sports medicine veterinary surgeons and to trainers to provide an indication of the magnitude of change in performance that might influence finishing position.

Materials and Methods

Race performance was evaluated using race times, which were accessed from www.turftrax.com. The accuracy of turftrax data has previously been validated (Spence *et al.,* 2008). Group races are considered to be the highest level of racing and are thus equivalent to elite level in other sporting disciplines.

Group 1, 2 and 3 races for both flat and national hunt races over a 5 year period were included (2008-2012). For each race, the time for the first, second, third, fourth and fifth placed horse was recorded. Races were excluded if times to 4th place were not published. Races were divided into 5 categories: for flat races 3 categories were included: flat races of 6 furlongs, 1 mile or 1 mile 4 furlongs. For national hunt 2 categories were included: hurdle races over 2 miles or chase races over 3 miles.

Statistical analysis

The winning margins were calculated by determining the percentage difference in race time between first and second place, first and third place, first and fourth place, and first and fifth place. The percentage difference in race time was calculated by (placed time-winning time)/ winning time x 100.

The difference in winning margins between flat and national hunt races were compared using an unpaired t test. The effect of race distance on winning margins was analysed using unpaired t-tests (for national hunt races) and ANOVA (for flat races).

One percent of the fourth placed time was calculated and subtracted from the fourth place time. This was compared to the winning time for each race to determine what difference a 1% improvement in performance would have to the fourth placed horse.

Results

Race times from a total of 416 races were included (275 flat races and 141 national hunt races). For all 416 races, times were available from 1st to 4th place, there were 4 flat races in which the 5th place time was not recorded and 12 national hunt races in which the 5th place time was not recorded.

The winning margin or percentage difference in race time between the first and second, first and third, first and fourth, and first and fifth placed horse is shown in table 1. Overall the mean percentage difference between first place and second place was only 0.32%.

There were statistically significant differences in the percent difference between first and second ($p=0.006$), first and third ($p=0.046$), first and fourth ($p=0.004$) and first and fifth ($p=0.017$) between flat and NH races. In all of these, the overall margins were smaller for flat races than for national hunt races.

There were no statistically significant differences in the winning margins for the various flat race distances (figure 1). There was a statistically significant difference between first place and second place for the national hunt distances, with the margin being smaller in the 3 mile chase than in the 2 mile hurdle race (figure 1). There was no statistically significant difference between the two national hunt distances for any other winning margin (first to third, first to fourth, first to fifth).

When a 1% improvement in race time was applied to the fourth placed horse this would result in the winning time in 76% of flat races and 50% of national hunt races.

Discussion

This study shows the small margins between winning and placing in horseracing. Across all of the races analysed the difference between coming first and second was as low as 0.32%, the difference between coming first and third was 0.75% and between first and fourth was 1.15%.

These results are similar to those of elite human sporting disciplines. The average difference in performance between first and fourth place in women's track and field events for the last three Olympiads was 1.7% for sprint events, 0.98% for distance events, 5.35% for throw events and 3.21% for jump events (Andre *et al.,* 2011).

In this study the winning margins were significantly smaller in flat races than in national hunt races. It is unclear whether breeding horses for flat races or training regimes for flat horses has resulted in less population variation, or whether the shorter race distances compared to national hunt races account for less spread. It is unclear why the margin between first and second is smaller for 3 mile chase races when compared to 2 mile hurdles races.

This study also showed that if a 1% improvement was made to the fourth placed horse, this would result in the winning time in 76% of flat races and 50% of national hunt races. This difference is explained by the greater spread for national hunt races, which would mean that a greater enhancement would be required in national hunt horses to promote a horse to a winning position from a placing than for flat races. Again this result is similar to human athletes, particularly at Olympic levels, when relatively small changes in performance (<1%) result in a worthwhile enhancement of finishing position (Hopkins *et al.,* 1999, Davison *et al.,* 2009).

These results suggest that training strategies and veterinary interventions that result in a small percentage improvement in performance may translate to a meaningful difference in terms of winning/placing. Treatments or combinations of treatments that accumulate to a fraction of a percent improvement may be considered warranted. Research studies in human athletes

which have calculated the smallest worthwhile performance enhancement as half the within-athlete variability have shown that coaches and sports scientists should focus on enhancements of as little as 0.3-0.5% for elite track athletes through 0.9-1.5% for elite field athletes.

Veterinary surgeons will also be interested in how the chance of winning is affected by a performance decrement, such as might occur with injury or disease. In human athletes studies have shown that a decrease in performance as small as 1% is enough to potentially push an elite track and field athlete from first to fourth place (gold medal to no medal) (Andre *et al.*, 2011).

In conclusion, this study has shown that similar to human sporting disciplines, the winning margins in horse races are very small and therefore small improvements in performance can result in worthwhile improvements in finishing position.

References

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Table 1: Shows the margins between first and second, first and third, first and fourth and first and fifth for the races analysed.

Type of race	Percentage difference in race time between 1st and 2nd mean (s.d.)	Percentage difference in race time between 1st and 3rd mean (s.d.)	Percentage difference in race time between 1st and 4th mean (s.d.)	Percentage difference in race time between 1st and 5th mean (s.d.)
Flat				
6 furlongs	0.31 (0.33)	0.60 (0.47)	0.83 (0.53)	1.04 (0.55)
1 mile	0.28 (0.31)	0.56 (0.41)	0.84 (0.61)	1.05 (0.59)
1 mile 4 furlongs	0.25 (0.25)	0.48 (0.32)	0.87 (1.45)	1.29 (2.62)
Overall flat	0.28 (0.30)	0.55 (0.41)	0.84 (0.92)	1.12 (1.49)
National Hunt				
2 miles hurdles	0.54 (0.54)	1.10 (0.81)	1.72 (1.24)	2.52 (2.14)
3 miles chase	0.21 (0.20)	1.19 (5.20)	1.78 (5.29)	2.19 (8.86)
Overall NH	0.40 (0.44)	1.14 (3.45)	1.74 (3.59)	2.88 (5.88)
Total	0.32 (0.36)	0.75 (2.05)	1.15 (2.25)	1.52 (3.6)

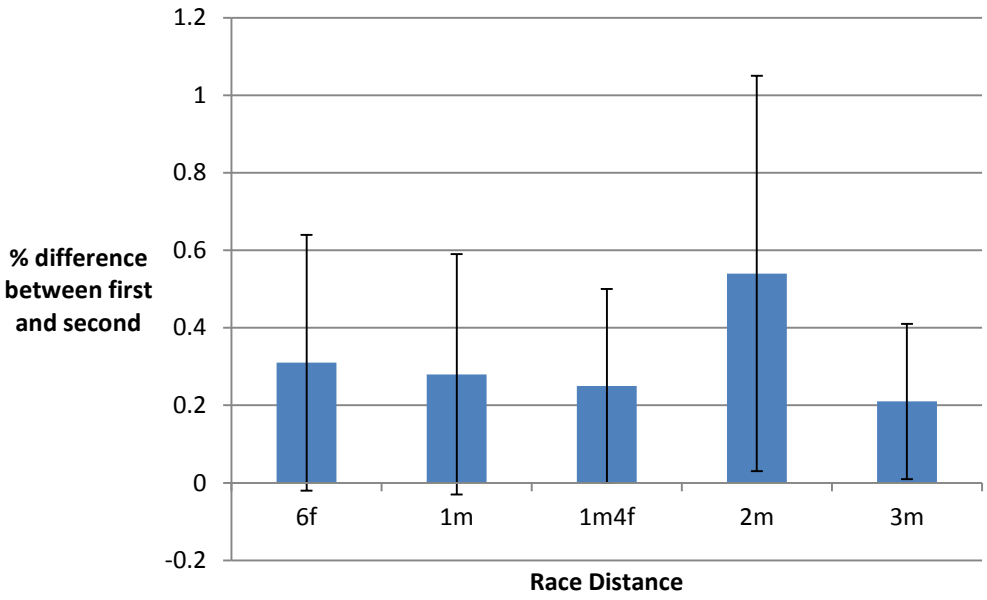

Figure 1: Shows the winning margin (percentage difference between first and second) for the various race distances.